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MEMORANDA FROM THE U. S. GEOLOGICAL SURVEY.

TOPOGRAPHIC MAP sheets of New York State recently issued are: In central New York the Palmyra quadrangle, which includes portions of Wayne and Ontario counties, in the region surrounding and north of Palmyra and Newark, N. J. ; and the Geneva quadrangle, showing the country in Seneca and part of Ontario counties bordering the foot of Seneca and Cayuga lakes and embracing the cities of Geneva, Waterloo, and Seneca Falls. In the Adirondack region the Wilmurt quadrangle, consisting of adjoining portions of Herkimer and Hamilton counties in the mountainous section drained by the West Canada Creek; and the Indian Lake quadrangle, showing Indian Lake and a number of other smaller bodies of water. In southern New York the eastern portion of Orange County, with the city of Newburgh, is represented in the Schunemunk quadrangle, which takes its name from the Schunemunk Mountain—a conspicuous topographic feature; this map shows most of the fertile dairy country east of the line of the Lehigh and Hudson River Railroad. The Millbrook quadrangle represents the northern portion of Dutchess County, adjoining the Connecticut line; on it are represented all the towns and physical features of the valleys of the Tenmile River and the Webatuck and Wappinger creeks, and those of the intervening country from somewhat south of Millbrook to Pine Plains and Mt. Riga.

The maps are all drawn on a scale of about 1 inch to the mile, and cover rectangular sections of country equal to 1.5 degrees of latitude and longitude. The region in the Adirondack Mountains including and surrounding Mt. Marcy, the Adirondack Mountain reserve, Keene Valley, and other well-known localities and features is represented on a map known as that of the Mt. Marcy quadrangle. All the roads and trails are indicated, and the mountainous nature of the region, together with the principal altitudes above sea-level.

The White Haven and Bolton quadrangles cover a portion of the country surrounding the northern shores of Lake George and the southern extremity of Lake Champlain. In the Broadalbin quadrangle portions of Saratoga and Fulton counties are included, and the map shows the rolling foothill country lying just north of the city of Amsterdam. The Hudson River and its valley, for a width of 10 miles or more, from Hudson to Saugerties, appear on the Catskill sheet. Each sheet covers about 200 square miles of territory.

THE SOUTHERN APPALACHIAN MOUNTAIN REGION.—The importance of the Southern Appalachians as a source of water supply is shown by the effort to preserve a large part of it as a national forest reserve.

The United States Geological Survey, through the Division of Hydrography, has gathered a mass of information which has lately appeared in its reports Nos. 62 and 63 of the series of Water-Supply and Irrigation Papers. The report has been compiled by Mr. H. A. Pressey, engineer in charge of the hydrographic field work on the Atlantic coast.

Among aspects of the region one of the most impressive is the rapid destruction of the standing timber. Not only is the soil on the steep hillsides left without protection, and soon washed away by heavy rains, but its productive qualities seem to remain for only a few years after the removal of the trees. The destruction of the forest also greatly impairs the efficiency of the streams, which lose their steadiness of flow.

Owing to the numerous steep slopes in the region, many admirable water powers have been found to exist, which may be made of the utmost value to the South as a source of cheap power.

THE NORFOLK QUADRANGLE.—This is a special map formed by combining a number of topographic sheets, previously published, of the country surrounding Norfolk, Va. The section covered by the new map, known as the Norfolk quadrangle, includes Fort Monroe, Newport News, Hampton Roads, Norfolk and Portsmouth, and extends for about four miles south of the North Carolina line; it also covers a large area of the Dismal Swamp. It has been compiled with great accuracy and minuteness of detail, even the houses in the country districts being located on it, and is of more than ordinary interest in indicating the topographic features and the inequalities of relief by a system of contour lines.

A striking peculiarity of the Dismal Swamp is clearly brought out by the map, which shows that the surface of the swamp stands from 7 to 10 feet higher than the surrounding country, and the unusual phenomenon of streams draining out of it in all directions is observed.

The detail of the map is enriched by the addition of ocean soundings and descriptions of the marine bottom.

TEXAS-INDIAN TERRITORY.—The Gainesville Quadrangle is a map of 980 square miles of country, including the greater part of Cooke County, Texas, and an area in the Indian Territory sufficient

to make the total area covered a quadrangle of thirty minutes of latitude by thirty minutes of longitude.

Among other features shown are the exact location of numerous levelled bench marks, with their elevations above sea-level to the nearest even foot, the location of each detached house outside of cities, the principal streets and houses in large cities and towns, the mean magnetic declinations, and on the Indian Territory side of the Red River the location of land survey lines.

FLORIDA PHOSPHATE DEPOSITS.—A report, nearly completed, by Mr. G. H. Eldridge, brings to light a number of interesting features of the Florida phosphate beds. A basement rock of Eocene age, at least 1,000 feet in thickness, was discovered buried under limestones, marls, clays, and sandstones of later date. The phosphate beds are found to lie in a line parallel with the Gulf coast and from 15 to 20 miles inland. Here the limestones, and perhaps some of the marls, have been altered to phosphate and broken down into a mass of boulder-like rocks embedded in clays and sands. They are locally known as "hard rock," and carry from 80 to 85 per cent of phosphate of lime. Another form of occurrence which the phosphate takes is a series of pebbles, probably derived from the hard rock and found in old dried-out lagoons and along river channels in the form of bars. Their proportion of phosphate amounts to from 62 to 75 per cent.

The report will also include a map which will show the position and extent of the phosphate beds and other interesting geologic features. The preparation of this map involved unusual difficulties, owing to the heavy mantle of recent sands, which covers areas of great extent.

MAP OF THE COLORADO CAÑON.—The demand for an accurate and detailed map of the famous Cañon of the Colorado in Arizona has led to a resurvey of this region by the United States Geological Survey, under the charge of François E. Matthes, topographer. The Grand Cañon, formerly reached only by stage route over a desert country, has recently been made accessible by a branch line of the Santa Fé route from Williams, and during the one year that this road has been in operation the Cañon has been visited by thousands of tourists.

The Geological Survey expects to publish a series of atlas sheets covering the entire extent of the Grand Cañon proper and considerable areas of the high plateaux on either side. The first of these

sheets, to be known as the Bright Angel, is nearly completed, and will be available to the public next summer. It includes almost all of the scenery visible from the Bright Angel Hotel, familiar to every visitor. The Colorado River traverses from east to west the quadrangle represented by this sheet, and divides it almost symmetrically. The new map will be on a scale of one mile to the inch, and the contour interval will be 50 feet. It will show every pinnacle, spur, and gully in its true proportions, and each line of cliffs and terraces may be traced along the cañon walls.

The dimensions of the Grand Cañon have been the subject of much discussion ever since it was first explored. It may therefore be of interest to give some figures taken from this new survey. The average width from rim to rim does not exceed ten miles throughout the Kaibab, or widest section of the cañon, and it frequently narrows down to eight miles. The river does not occupy the middle of the gigantic trough, but flows at a distance varying between one and three miles from the south side. Practically all of the magnificently-sculptured pinnacles and mesas (the so-called temples) lie north of the river, and at distances of from five to seven miles from the view points usually visited by tourists. The depth of the Grand Cañon, in one way, has been overstated; in another, understated. Measured from the south rim, the total depth is considerably less than a mile. From the rim at the Bright Angel Hotel, where the altitude is 6,866 feet above sea-level, to the high-water mark of the river at the foot of the tourist trail, the drop is 4,430 feet. The highest point on the south rim at the Grand View Hotel is 7,496 feet, about 4,900 feet above the river. From the north side, however, the drop to the water-level averages considerably over a mile, and in many places even exceeds 6,000 feet. It may be stated that the north rim is from 1,000 to 1,200 feet higher than the south, thus producing that high, even sky-line so striking in all views obtainable by the tourist. The figures here given are based on spirit levels run in connection with the map work. They are the first that have ever been run to the bottom of the chasm, and the high standard of accuracy maintained throughout will cause them to be considered authoritative and final.